Chapter

Protected Areas in Cameroon at the Mercy of the 2035 Emergent Project

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Abstract

Cameroon is investing efforts to protect the environment through the creation of protected areas (PAs) while at the same time longing to attain its development objectives of becoming an emergent country in 2035 through the exploitation of its natural potentials. Attaining both objectives is usually accompanied with conflicts between different ministerial departments. This paper consequently seeks to identify those PAs that overlap with other projects (mining, agro-industries, and forest exploitation) and calculate the surface area of the former that has been taken up by the later. Data were obtained from the Interactive Forestry Atlas of Cameroon Version 3.0 produced by the World Resources Institute (WRI) and its partners. Internet sites and existing reports on environmental and development issues in Cameroon among others served as important sources of information. Results demonstrate that an approximate area of more than 1 million hectares (ha) of PA land has been taken-up by the three economic development-oriented projects mentioned above. That is an estimated 1,173,479 ha, 3575 ha and 1814.44 ha of PA land that has been taken-up by mining sites, agro-industries, and forest exploitation, respectively. For both objectives to be attained, concerted efforts from all ministerial departments concerned is mandatory.

Keywords: protected area, vision 2035, mining sites, agro-industries, emergent project

1. Introduction

The government of Cameroon adopted in 2003 the poverty reduction strategy document which is generally considered as a milestone in the process of reforms embarked on by the government at the end of the year 2000. It is highlighted in this document that Cameroon is endowed with significant assets but also faces major challenges which are how to diversify its economy, consolidate growth, and improve the standard of living of its population [1]. Consequently, the central objective of these reforms, which the Government is pursuing with determination, is to significantly reduce poverty and attain a strong and sustainable economic growth [1]. To attain these objectives, a number of priority areas of focus in line with Cameroon's key development objectives were identified. Among them, one has priority 2 which is focused on "strengthening growth by diversifying the economy"

and priority 4 whose main objective is "developing basic infrastructures and natural resources while protecting the environment" [1].

However, the overall growth rate was not up to the expected level necessary for drastic poverty reduction. Consequently, the Government decided to revise the economic growth and poverty reduction strategy. To prepare the revise growth and employment it was necessary to realize some major projects, notably: the formulation of an economic development vision by 2035 amongst others [2]. This vision 2035 reads as follows: "Cameroon: an emerging, democratic and united country despite its diversity" [1, 17]. Four major goals have been developed to help the government in attaining the vision. These are (i) reducing poverty to a socially acceptable level; (ii) becoming a medium-income country; (iii) acquiring the status of a newly industrialized country; and (iv) reinforcing national unity and consolidating the democratic process [2].

In order for Cameroon to attain the first three goals, the country has to accelerate its growth rate through the intensification of agro-pastoral and pisci-cultural activities as well as mineral extraction.

Concerning agriculture and to show the countries zeal to attain the objectives, president Paul Biya stated in his 2011 election campaign speech in Maroua that:

> *… I have the ambition to transform our country into a real breadbasket for Central Africa. … at present, our agriculture accounts for 45,000 jobs and by implementing the measures and granting the new incentives envisaged, agriculture is expected to create 165,000 jobs by 2014 and 200,000 by 2016*[1].

On the 10th of February 2016, that is the eve of the 50th anniversary of the youths' day celebration in Cameroon, the president again reiterated the importance of agricultural to the Cameroonian youths by stating that:

> *The soil has never betrayed anyone. Do not be afraid to take the plunge and become the agricultural entrepreneurs that Cameroon needs. It is a noble and rewarding trade in the so called real economy. I therefore urge the elders to shoulder their responsibility: it is proper to urge the youths to work the land and it is unwise to dissuade them from doing so.* Paul Biya[2].

Regarding the mineral extraction sector, Cameroon is still endowed with important unexploited natural potentials and to accelerate its industrialization, it intends to intensify the exploration and then exploitation of these potentials. Priority will be on petrol, gas, bauxite, aluminum, iron, zinc, nickel, cobalt amongst others [3].

These poverty reduction and development objectives notwithstanding, Cameroon has equally engaged itself in some environmentally and protected areas related conventions. Cameroon signed and ratified the Convention on Biological Diversity (CBD) in 1992 and 1994 respectively. Even before the signing of the CBD, Cameroon already demonstrated its commitments to environmental protection by creating the Ministry of the Environment and Forestry in April 1992. Two years later, that is, in 1994, a forestry legislation was enacted so as to take into consideration the recommendations of the Rio Summit and its related conventions [4]. In 1996, a new law relating to the environment was promulgated [5].

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[1] Campaign speech made by President Paul Biya in Maroua on October 6, 2011 during the occasion of the 2011 presidential election.

[2] This is an excerpt of President Paul Biya's message to the youth. This message was delivered over CRTV (Cameroon Radio and Television Corporation) on the 10th of February 2016 on the eve of the 50th anniversary of the youths' day celebration in Cameroon.

The enactment of these laws were supervised by the ministry of the environment and forestry, responsible for all forestry and environmentally related issues in Cameroon until December 2004, when it was split by a presidential decree into the ministry of forestry and wildlife and the ministry of the environment and the protection of nature[3]. In a decree re-organizing the government in December 2011, the latter ministry was renamed, ministry of the environment, protection of nature and sustainable development[4]. Certainly due to the intrinsic link that exist between the environment and development.

Cameroon is accordingly investing efforts to protect the environment (especially through the creation of protected areas) while at the same time longing to attain its development objectives of becoming an emergent country in 2035 through the exploitation of its natural potentials which are all harbored by the same environment. Attaining both objectives is usually accompanied with a number of conflicts/overlaps between different ministerial departments. It is for this reason that this paper seeks to identify those environmental protection schemes (protected areas) and economic-development geared projects (large scale agriculture, wood and mineral exploitation projects) that are in conflict with each other. Concretely, the paper intends to (i) identify those protected areas that overlap with other projects and (ii) calculate the surface area of these protected areas that have been taken up by these projects.

1.1 Worth and the place of protected areas in life's sake

The International Union for the Conservation of Nature-IUCN and the World Commission on protected areas have defined a PA as:

> *An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means* [6].

Also adopted at the global level, at least by the 188 countries currently party to the Convention, is the PA definition of the Convention on Biological Diversity-CBD.

> *A geographically defined area which is designated or regulated and managed to achieve specific conservation objectives* [7].

A PA may be a wetland, a tropical or deciduous forest, a cultivated landscape of value, an alpine region, a savanna, a marine area or any number of other types of natural or partially modified ecosystems or indeed any combination of types of ecosystems [8]. According to [9], PAs are a traditional means for pursuing wildlife management and have become increasingly central to conservation strategies. PAs are important tools for the conservation of biological diversity and are cornerstones of sustainable development strategies since they harbor great biological richness and are a major source of material and non-material wealth [10]. According to [11], PAs are the most common tool for *in situ* conservation of biodiversity globally. They are consequently, established in order to conserve forest of biodiversity value from damaging processes, such as deforestation. The evidence reviewed in the report of [12] indicates that there is less deforestation within formally protected areas than in

[3] Decree No 2004/320 of December 8, 2004 re-organizing the government of the Republic of Cameroon.

[4] Decree N° 2011/410 of December 9, 2011 organizing the Government of the Republic of Cameroon.

the areas surrounding them. They have thus proven themselves to be an effective tool for the conservation of biodiversity in situ [13].

Protected areas are also the basis for assessing how engaged and committed governments are in conserving biodiversity [14] and so lie at the heart of global commitments intended to preserve for the benefit of present and future generations a range of goods and services essential for life on earth [15]. The importance of PAs is reflected in their widely accepted role as an indicator for global targets and environmental assessments [16]. PAs occupy an important position in the strategic plan for biodiversity 2011–2020 and the Aichi targets which were adopted at the tenth conference of the parties (CoP10) [17]. Target 11 which is related to PAs stipulates that by 2020, at least 17% of terrestrial and inland water areas, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of PAs and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes [17]. This certainly explains why the world's system of PAs has grown exponentially over the past 25 years, particularly in developing countries where biodiversity is greatest. There are currently over 130,000 protected areas worldwide, covering around 13.9% of the Earth's land surface and 5.9% of the territorial marine surface [18] as against 12.2% of the surface of the globe in 2008 [19] and 8.82% in 1997 [20].

Concurrently, the mission of PAs has expanded from biodiversity conservation to improving human welfare. The result is a shift in favor of PAs allowing local resource use. This implies that aside from their environmental benefits, they can also generate significant economic resources as they represent important stocks of natural, cultural and social capital, supporting the livelihood and wellbeing of many. For example a study conducted in 2003 found that 33 of the world's 105 largest cities obtain a significant proportion of their drinking water from PAs [10]. Providing this water through other means would likely be a costly endeavor and beyond the means of some cities. They can also create investment opportunities and employment. For example, in Guatemala, the Maya Biosphere Reserve generates an annual income of approximately US $47 million while creating employment for 7000 people [10]. Governments therefore recognized PAs as economic institutions which have a key role to play in the alleviation of poverty and the maintenance of the global community's critical life-support systems.

2. Material and data sources

The Republic of Cameroon is a nation with contrasting natural milieu and diversity. This has earned the country the common appellation of "Africa in miniature". Approximately, half of its surface area of 47,550,000 hectares (475,500km^2), is covered by the dense humid forests with the other portion covered with savanna and steppe vegetation. Specifically, these forests cover about 45.6% of the national territory [21]. Most of the forests form part of the Congo Basin forest which is the second largest area of dense tropical forest in the world, following the Amazon basin [22]. This country which extends from latitudes 2° to 13° north of the equator and longitudes 8° 25′ and 16°20′ east of the Greenwich Meridian is ranked second in terms of forest cover in Africa after the Democratic Republic of Congo (DRC). It is bordered by Nigeria to the west, Chad to the north, the Central African Republic to the east, Congo, Gabon and Equatorial Guinea to the south and the Atlantic Ocean to the south west.

In Cameroon, 9000 species of flora have been registered of which 156 are endemic. Equally, 297 species of mammals, (10 endemic), 849 species of birds

(11 endemic), 373 species of reptiles and amphibians (19 endemic) and 451 species of fish have been cataloged [23].

A number of protected areas have consequently been created with the intention to conserve these biological wealth. However, since the country basically depends on available natural resources for its growth, the attribution of exploitation permits for large scale agricultural development projects, mining and forestry exploitation has always been done without appropriate consultation between the various ministerial departments and appropriate field work so as to verify the land use and land cover of the area being allocated. Consequently, a number of these permits are attributed closed to protected areas and some even overlap with these PAs and other land use types. Identifying these PAs and evaluating the area taken up by these various exploitation permits is the major objective of this work.

In order to attain this objective, data was obtained from the database produced by a team composed of staff of the World Resources Institute (WRI), the Ministry of Forestry and Wildlife (MINFOF) of Cameroon, and other partners including the Centre Technique de Forêt Communale (CTFC), and GIZ-Pro-PFE. The WRI and MINFOF have collaborated since 2002 to build national capacity to monitor and manage forests focusing on modern techniques of information management. Together, this information is assembled in the interactive forest atlas of Cameroon, a complete cartographic database containing forest land use allocation and related activities in Cameroon. For the present chapter, Internet sites and the Interactive Forestry Atlas of Cameroon Version 3.0 produced by the above-mentioned structures in 2012 served as important sources of data. Existing reports on forestry and environmental issues in Cameroon notably the national biodiversity strategy action plan (NBSAP) and Cameroon's national reports to the CBD (especially the fifth national report published in 2014) amongst others served as important sources of information.

Data for protected areas, mining and agro-industrial sites as well as forest management units (FMU) were extracted from the WRI database. Since we intended to identify those protected areas that overlap with mining exploitation sites, these first two sets of data were extracted and overlaid on each other. As these data come from the same database, they could easily overlay due to fact that they have the same coordinate system, that is, WGS 84. The same operation was carried out for PAs and agro-industries, the former and FMU as well as with PAs that had multiple conflict zones.

The surface area for the overlapping zone was gotten by employing the Geoprocessing tool in ArcGIS 10.5. Specifically, the overlapping zone was clipped by using a clip operation in the same software and then the surface area taken-up in hectares was calculated with the use of the calculate geometry tool. These operations helped in the realization of the objectives of this work which were to identify those protected areas that overlap with other development geared projects and then calculate the surface area of these protected areas that have been taken-up.

3. Results

Statistics demonstrate that a total of 15 PAs covering about 2,626,870 hectares have conflicting boundaries with mining permit sites in Cameroon. The total surface area of these PAs that overlapped with mining permits[5] is estimated at 1,173,479 hectares which is approximately 45% of the total surface area that is in conflict with mining activities (**Table 1**).

[5] These permits could be exploitation, exploration and permits for research.

Name of PA	Official surface area (ha)	Area taken-up by mining activity (ha)	% of total surface area taken-up by mining activity
National Parks			
Bénoué	180,000	163,220	91
Bouba Ndjida	220,000	83,938	38
Bouba Bek	238,225	188,225	79
Campo Ma'an	264,064	160,004	60
Ebo	112,000	39,635	35
Kimbi-Fungom	95,380	15,235	16
Kom	67,843	57,235	84
Korup	125,900	12,026	10
Lobéké	217,854	80,273	37
Nki	309,362	182,104	59
Vallé de Mberé	77,760	2559	3
Sub-Total	**1,908,388**	**984,454**	**51.5**
Wildlife Reserves			
Dja	526,000	62,643	12
Ngoyla	156,672	107,373	68
Sub-Total	**682,672**	**170,016**	**25**
Wildlife sanctuaries			
Mengame	27,723	11,405	41
Tofala Hill	8087	7604	94
Sub-Total	**35,810**	**19,009**	**53**
Grand Total	**2,626,870**	**1,173,479**	**44**

Source: [24, 25].

Table 1.
Area and percentage area of PAs taken-up by mining activities.

Table 1 illustrates that 15 PAs divided into three categories have conflicting boundaries with mining permits. These are national parks (11), 2 wildlife reserves and sanctuaries each. While 51.5% of the surface area of national parks are conflict zones, 25% and 53% of wildlife reserves and wildlife sanctuaries in that order overlap with mining permits. The overlapping area of PAs and mining permit ranges from 94% for the Tofala Hill Wildlife Sanctuary, to 91% for the Bénoué National Park and 12% and 3% for the Dja Wildlife Reserve and the Vallé de Mberé National Park respectively.

The spatial distribution of both these PAs and mining sites as well as their zones of conflicts is presented on **Figure 1**.

Figure 1 demonstrates the distribution of PAs and mining sites that overlap with each other in Cameroon. It illustrates that protected areas in the East and South regions of the country are the most affected. A total of eight PAs in these regions have their boundaries overlapping with those for mining exploitation sites. While

the South west and North Regions have two PAs each that have their limits overlying, the North West, Adamawa and Littoral each have one PA meeting with mining sites.

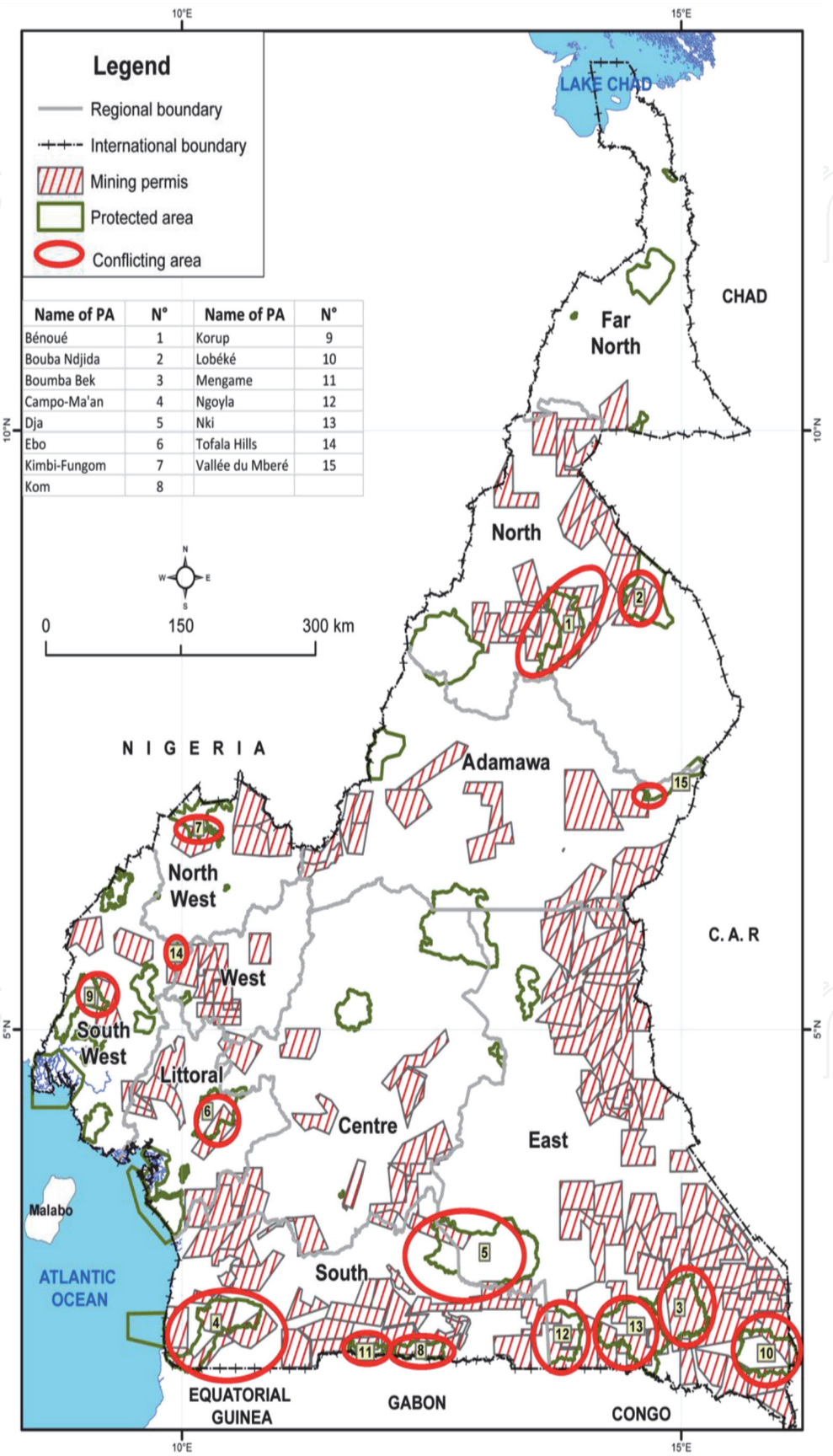

Figure 1.
Overlapping areas of PAs and mining permits.

Name of PA	Surface area (ha)	Conflicting area (ha)	% Of conflict area
Ndongere	237,311	74	0.031
Korup	125,900	137	0.001
Douala-Edea	262,935	3412	1.246
Rumphi Hills	46,655	170	0.003
Bayang_mbo	66,000	25	0.037
Lac Ossa	4572	61	1.334
Total	**743,373**	**3575,07**	**0.480**

Table 2.
Area of conflict between PAs and agro-industries.

Name of PA	Surface area (ha)	Conflicting area (ha)	% Of conflict area
Mengame	27,723	1097,38	4
Kom	67,843	6970	0.102
Ebo	112,000	435,13	0.388
Korup	125,900	212,67	0.168
Total	**333,466**	**1814,88**	**0.544**

Table 3.
PAs and FMUs with incompatible limits.

Concerning PAs that have conflicting boundaries with agro-industrial structures, statistics revealed the following (**Table 2**).

Table 2 demonstrates that six PAs have overlapping boundaries with agro-industries. These PAs have a surface area of 743,373 ha. Out of this area, 3575 ha, that is about 0.48% of this surface area has been taken-up by agro-industries. The most affected PAs are Lac Ossa and Douala-Edea with 1.334 and 1.246% of their surface areas, respectively, that conflict with agro-industries.

The major agro-industries operating in these areas are *Hévéa Cameroun* (HEVECAM) which is specialized in the cultivation of rubber, *Société Camerounaise de Palmeraies* (SOCAPALM) and SGSOC Heracles (Global Sustainable Oil Cameroon) for palm nut cultivation and *Plantation du Haut Penja* (PHP) for bananas. It is worth noting that these structures are both nationally and internationally owned.

Apart from the allocation of permits for mining and agro-industrial activities that have been ear-marked by the government of Cameroon as corner-stones for raising revenue and consequently economic growth and national development, forestry exploitation has for a long time served in this respect. Forestry Management Units-FMUs (known in French as UFAs), have accordingly been allocated for exploitation without taking into consideration the existing protected areas in the landscape. The boundaries of some of these FMUs therefore intersect with those of some PAs (**Table 3**).

Four PAs limits correspond with those of FMUs. Out of a surface area of 333,466 ha, 1814,88 ha, that is approximately 0.544% of the area overlaps with each other. The most affected of these PAs is the Mengame Wildlife sanctuary where about 109,738 ha (4%) of its surface area corresponds to that of a FMU.

The three economic oriented activities have taken up an area of more than 1 million hectares approximately, which is about 31.82% of the surface area of the PAs

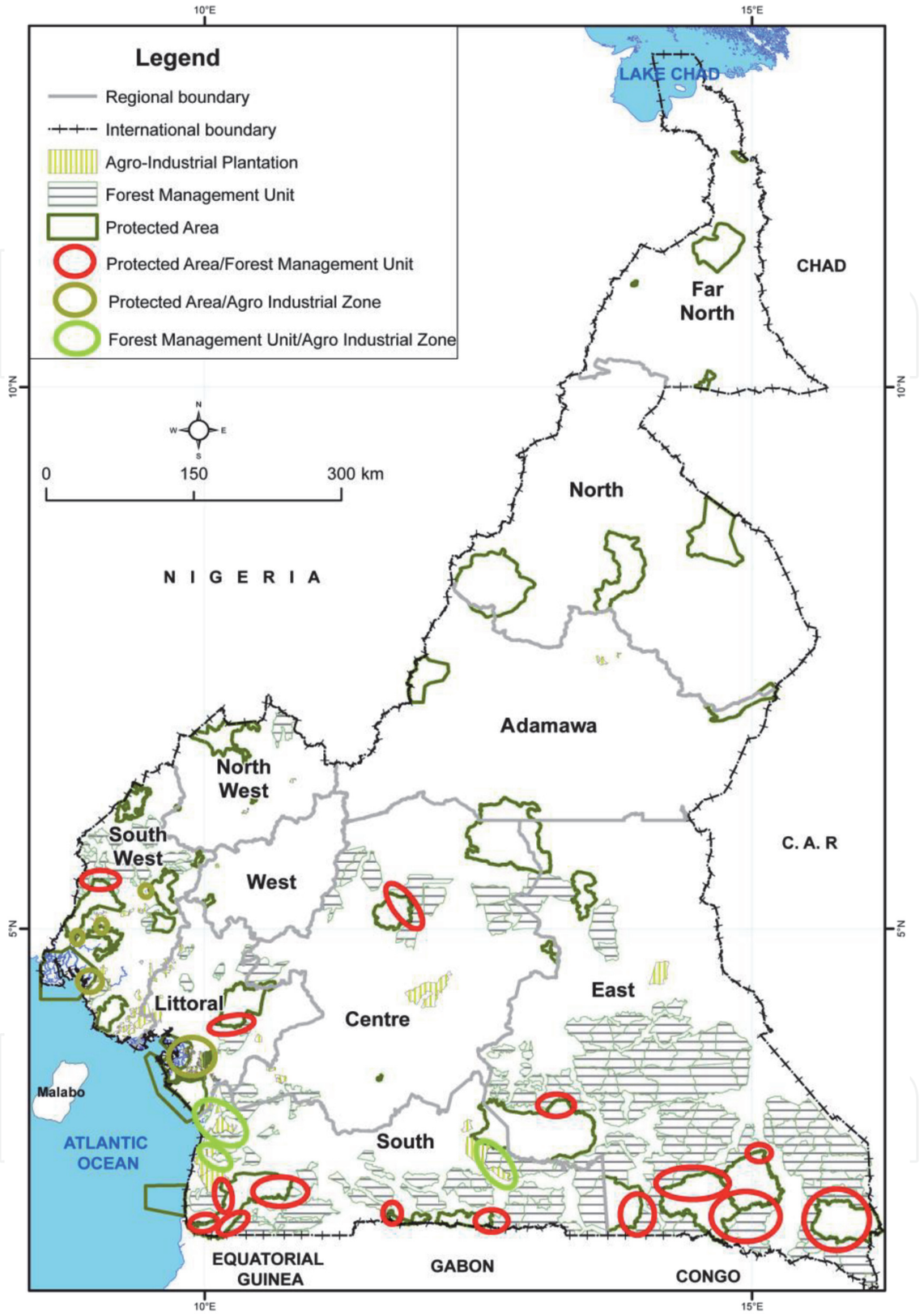

Figure 2.
Overlap of PAs, agro-industries and FMUs.

concerned. While mining exploitation activities have occupied close to 44.6% of the surface area of the PAs in question, agro-industries and FMUs, are overlaid on 0.480 and 0.544% of these PAs, respectively.

It should be noted that not only PAs overlapped with economic related activities. Results demonstrate that the economic related activities sometimes have conflicting

Name of PA	Area (ha)	Mining		Agro-industries		FMUs		Total area	Total %
		Area (ha)	% Of area	Area (ha)	% Of area	Area (ha)	% Of area		
Mengame	27,723	11,405	41	0	0	1097,38	4	12,502,38	45
Ebo	112,000	39,635	35	0	0	435,13	0.388	40,070,13	35.77
Korup	125,900	12,026	10	137	0,001	212,67	0.168	12,240,04	9.72

Table 4.
PAs with multiple exploitation boundary conflicts.

boundaries too. This overlapped of PAs with agro-industries and FMUs as well as agro-industries conflicting with FMUs is illustrated on **Figure 2**.

Figure 2 proves that conflict between PAs and FMUs is predominant in the South and East regions of the country while that between the former and agro-industries is dominantly in the South West region of the country.

Analysis further reveal that while some of the PAs have been affected by just one form of exploitation, that is either mining, agro-industrial or forestry exploitation, the following have been touched by one or two of the above-mentioned type of activities (**Table 4**).

Referring to the PAs with multiple exploitation boundary conflicts, Mengame Wildlife Sanctuary, Ebo and Korup National Parks have 45, 35.77, and 9.72% correspondingly of their area super-imposed on the three activities mentioned above.

4. Conclusion

This study has proved that Cameroon is putting efforts to respect the engagements it took at the international level by signing and ratifying the CBD in 1992 and 1994 in that order. It has done so by creating a number of protected areas. However, within the framework of its development agenda, the country has its 2035 vision which is to become an emergent country. For this vision to come to fruition, the country has embarked on the diversification of its income sources. It has consequently granted several mining; agro-industrial and forest exploitation permits to both international and national companies without taking into consideration the location of some protected areas that have been created.

Results illustrate that 15 PAs have their boundaries overlapping with mining sites. This gives an estimated 1,173,479 ha of PAs land that has been taken-up by mining exploitation permits in Cameroon. The results is corroborated by a preliminary research, by [26] which revealed that a total of at least 33 oil and mining permits have been granted inside of 16 different protected areas in Cameroon. According to [27], from 2011, a total of 494 mining permits were delivered. Among these are 90 exploration and 4 exploitation permits, 150 quarry exploitation permits, and 250 artisanal exploitation permits [28]. This is approximately 2 years after the growth and employment strategy paper which is the reference framework for the government's action over the period 2010–2020 and the Cameroon vision 2035 working documents were adopted.

It is a palpable proof that the government of Cameroon is matching words to action, as mining exploitation was recognized as a major assert to stimulate the national economy, though this is being done to the detriment of other environmentally protected land use schemes such as protected areas. The result of a study by [29] demonstrates that around 96 of the 147 protected areas evaluated in their work are affected by artisanal and small-scale mining in the world. According to [30],

approximately 7% of mines for four key metals directly overlap with PAs and a further 27% lie within 10 km of a PA boundary. Given the rapidly growing demand for metals, there is an urgent need to limit or mitigate such conflicts. Though this present study was not able to determine the degree of destruction caused by mining exploitation on PAs, [28], concluded in one of its reports that "all these mining activities have caused a total deforestation of the exploitation sites." The overlapping as well as allocation of mining permits close to PAs leads to conflict with national conservation objectives and according to [26], this represents an important threat and loss of biodiversity in the protected areas especially in renowned PAs as the Korup, Bouba Ndjida, and the Dja Biosphere reserve. Also, Ref. [31] concluded in their research that extractive industries can be a major cause of forest loss, as observed in parts of Papua New Guinea, India's Madhya Pradesh and Guyana.

Further results show that six PAs have overlapping boundaries with agro-industries. About 3575 ha, of PAs land has been taken-up by agro-industries. The major agro-industries operating in these areas are *Hévéa Cameroun,* which is specialized in the cultivation of rubber, *Société Camerounaise de Palmeraies* and Global Sustainable Oil Cameroon for palm nut cultivation and *Plantation du Haut Penja* for bananas. The ministry of the environment, protection of nature, and sustainable development recognizes the role of these agro-industries in land grapping. In one of its reports in 2014, it concluded that "there is currently a growing demand for land for new plantations opened on thousands of hectares of oil palms, rubber, coffee, cocoa, tea, and cotton. Large agro-industrial plantations with new land include: HEVECAM a rubber plantation which extended its plantation by four new blocks totaling 18,889 ha and SGSOC which is setting up a new palm plantation in an area of approximately 60,000 ha" [28]. Agriculture in all its facets accounts for 19.7% of GDP [13].

As concerns PAs and forestry exploitation, it was revealed that four PAs' limits correspond with those of FMUs making 1814,88 ha that overlaps with each other. Cameroon's forestry sector represents about 15,000 and 170,000 direct and indirect employment respectively and represents the third revenue source of the country after agricultural and petrol exportation [13]. This easily explains why a number of FMUs have been allocated for exploitation. As a result of the allocation of mining, agro-industrial and forest exploitation permits coupled with other land use activities in and out of protected areas, the forest area fell from 22.5 million ha in 1975 to 19.5 million in 2005, a difference of almost 3 million ha, corresponding to an annual loss of 100,000 ha/year. This lost is certainly accompanied with that of the biodiversity that is harbored in the forest. In order for this trend to be reversed, concerted efforts from all ministerial departments concerned is necessary.

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